

AMENDMENTS TO THE CLAIMS

Please amend claims 12, 19, 25 and 27-29 and 37-40, and add new claims 41-45. A complete listing of the claims, including their current status, is set forth below.

1-11. (Cancelled)

12. (Currently amended) A method for producing an insulin-producing cell *in vitro*, the method comprising:

introducing a nucleic acid molecule operably linked to a promoter into a ~~precursor~~ cell *in vitro*, the nucleic acid molecule encoding a neuroendocrine class B basic helix-loop-helix (bHLH) transcription factor, said introducing being in an amount sufficient for production of the neuroendocrine bHLH transcription factor and production of an insulin-producing cell;

wherein said ~~precursor~~ cell is ~~an embryonic stem cell or~~ a cultured gastrointestinal organ cell.

13. (Previously presented) The method of claim 12, wherein the neuroendocrine bHLH transcription factor is neurogenin3.

14. (Withdrawn) The method of claim 12, wherein the neuroendocrine bHLH transcription factor is a positive regulator of a neurogenin3 (Ngn3) regulatory pathway.

15. (Cancelled)

16. (Withdrawn) The method of claim 12, wherein the neuroendocrine bHLH transcription factor is neurogenin1, neurogenin2, NeuroD1/BETA2, neuroD2, math2, NeuroD4/Math3, math1/ATOH1, mash1/ASCL1/ASH1 or mash2.

17. (Cancelled)

18. (Previously presented) The method of claim 12, wherein the insulin-producing cell produced is an insulin-producing islet cell.

19. **(Currently amended)** A method for producing a mammalian insulin-producing cell *in vitro*, the method comprising the steps of:

introducing into a mammalian cell *in vitro* a nucleic acid molecule operably linked to a promoter, the nucleic acid molecule encoding a neuroendocrine class B bHLH transcription factor, wherein said introducing ~~providing~~ provides for expression of the transcription factor in the mammalian cell and production of insulin in the mammalian cell;

wherein said mammalian cell is ~~an embryonic stem cell or~~ a cultured gastrointestinal organ cell.

20. **(Original)** The method of claim 19, wherein the mammalian cell is a pancreatic cell.

21. **(Previously presented)** The method of claim 19, wherein the neuroendocrine bHLH transcription factor is neurogenin3.

22. **(Withdrawn)** The method of claim 19, wherein the neuroendocrine bHLH transcription factor is a positive regulator of a neurogenin3 (Ngn3) regulatory pathway.

23. **(Withdrawn)** The method of claim 19, wherein the neuroendocrine bHLH transcription factor is neurogenin1, neurogenin2, NeuroD1/BETA2, neuroD2, math2, NeuroD4/Math3, math1/ATOH1, mash1/ASCL1/ASH1 or mash2.

24. **(Cancelled)**

25. **(Currently amended)** A method for producing a mammalian insulin-producing cell *in vitro*, the method comprising the steps of:

introducing into a mammalian pancreatic cell *in vitro* a nucleic acid molecule the nucleic acid molecule being operably linked to a promoter, said nucleic acid molecule encoding neurogenin3 (Ngn3), wherein said introducing provides ~~providing~~ for expression of Ngn3 in the cell and production of insulin in the cell.

26. **(Cancelled)**

27. **(Currently amended)** A method for delivering insulin to the bloodstream of a mammalian subject, the method comprising:

introducing an insulin-producing cell produced by the method of claim 25 into a mammalian subject, wherein said introducing provides ~~providing~~ for production of insulin by the insulin-producing cell and delivery of insulin to the bloodstream of the mammalian subject.

28. **(Currently amended)** A method for delivering insulin to the bloodstream of a mammalian subject, the method comprising:

introducing an insulin-producing cell produced by the method of claim 12 into a mammalian subject, wherein said introducing provides ~~providing~~ for production of insulin by the insulin-producing cell and delivery of insulin to the bloodstream of the mammalian subject.

29. **(Currently amended)** A method for delivering insulin to the bloodstream of a mammalian subject, the method comprising:

introducing an insulin-producing cell produced by the method of claim 19 into a pancreas of a mammalian subject, wherein said introducing provides ~~providing~~ for production of insulin by the insulin-producing cell and delivery of insulin to the bloodstream of the mammalian subject.

30. **(Previously presented)** The method of claim 12, where the precursor cell is an adult pancreatic cell.

31-36. **(Cancelled).**

37. **(Currently Amended)** The method of claim 12, wherein said cultured gastrointestinal organ cell is pancreas cell.

38. **(Currently Amended)** The method of claim 19, wherein said cultured gastrointestinal organ cell is pancreas cell.

39. **(Currently Amended)** The method of claim 12, wherein said cultured gastrointestinal organ cell is a liver cell.

40. **(Currently amended)** The method of claim 19, wherein said cultured gastrointestinal organ cell is a liver cell.

41. **(New)** A method for producing insulin *in vitro*, comprising:

culturing a gastrointestinal organ cell *in vitro* to produce insulin, wherein said cell comprises a recombinant nucleic acid molecule comprising a nucleic acid molecule encoding a neuroendocrine class B basic helix-loop-helix (bHLH) transcription factor operably linked to a promoter.

42. **(New)** The method of claim 41, wherein the neuroendocrine bHLH transcription factor is neurogenin1, neurogenin2, NeuroD1/BETA2, neuroD2, math2, NeuroD4/Math3, math1/ATOH1, mash1/ASCL1/ASH1 or mash2.

43. **(New)** The method of claim 41, wherein said gastrointestinal organ cell is a pancreatic or liver cell.

44. **(New)** The method of claim 41, wherein said gastrointestinal organ cell is a gut or salivary gland cell.

45. **(New)** The method of claim 1, wherein said gastrointestinal organ cell is a gut or salivary gland cell.